

### REMARKS

By the present Amendment, claim 25 is amended to recite expressly a limitation that was previously implicitly recited. This leaves claims 15-35 pending in the application, with claims 15 and 25 being independent.

The amendment of claim 25 should be entered and considered on its merits, even though submitted after final rejection, since it does not raise new issues requiring further search or consideration, and places the claim in condition for allowance or better form for appeal.

Since claims 15-24 and 35 are allowed, the record will not be burdened with further comments thereon.

### Rejections Under 35 U.S.C. § 103

Claim 25 covers a device for igniting combustion of fuel in a combustion space 5 of an engine 2. The device comprises a microwave source 7 located outside of the combustion space and producing spaced microwave pulses of short duration and high energy. A microwave window 13 is connected to the microwave source through which the microwave pulses are injected in and uniformly throughout the combustion space of the engine to be absorbed by the fuel uniformly in all of the combustion space with the temperature of the fuel being increased uniformly by the microwave pulses when absorbed by the fuel due to the energy delivery, without forming plasma by selection of a time interval for injecting the microwave pulses, of power of the microwave pulses, of pulse duration and of pulse spacing, up to an ignition temperature.

The device, as claimed, relates to increasing the temperature fuel in the combustion space of an engine by a microwave source injecting microwave radiation in spaced microwave pulses over a large volume in the combustion space. The microwave radiation is in the form of one or

more spaced pulses of short duration and high energy. The formation of a plasma is prevented in the combustion space by the choice of the time interval of injection of microwave energy, its power, its pulse duration and its pulse space up to an ignition temperature.

None of the cited patents discloses or renders obvious this device.

Claims 25-30 apparently stand rejected under 35 U.S.C. §103 as being unpatentable over U.S. Patent No. 4,138,980 (not 4,138,890 as stated in the Office Action) to Ward.

Claims 31 and 32 stand rejected under 35 U.S.C. §103 as being unpatentable over the Ward '980 patent in view of U.S. Patent No. 4,297,983 to Ward.

Claim 33 stands rejected under 35 U.S.C. §103 as being unpatentable over the two Ward patents when further considered in view of U.S. Patent No. 2,563,952 to Nichol.

Claim 34 stands rejected under 35 U.S.C. §103 as being unpatentable over the two Ward patents and the Nichol patent when further considered in view of U.S. Patent No. 3,934,566 to Ward.

Relative to the claim 25 recitation of spaced pulses, three arguments appear to be raised in support of the rejection. The first argument involves the contention that the variation in frequency disclosed in the Ward '980 patent will change the spacing between peaks and thus, is alleged to form spaced pulses. The second argument involves the contention that the claims do not require that the pulses be of short duration and time. The third argument involves the contention that the pulses are a method limitation that does not adequately distinguish an apparatus or device.

In response to these three arguments, "pulses" as defined in this application are not provided by mere peaks of a continuous wave, but are separate and distinct blasts of energy that

are not connected by remaining portions of a wave. That definition of pulses in this application and now added to claim 25 distinguishes the peak interpretation relied upon in support of the rejection. Moreover, the claim recites a microwave source that produces spaced microwave pulses. That specified microwave source is a structural difference adequate to distinguish the claims over the prior art.

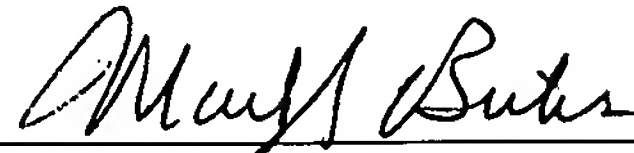
Relative to the limitation in claim 25 of the temperature being increased up to an ignition temperature, it is contended in support of the rejection that such limitation is disclosed in the Ward '980 patent at column 2, lines 60-65. However, this portion does not disclose microwave energy to increase the temperature up to an ignition temperature without the creation of a plasma, as claimed.

The comments that a wave or a signal is not patentable are irrelevant since the claims do not merely recite a wave or signal. The microwave energy source is recited as producing the spaced pulses that distinguishes this device in combination with the other claim structure.

Regarding claim 26, the Ward '980 patent allegedly discloses a window in its drawings, with the citation column 2, lines 60-68 as disclosing coupling members. The Office Action still fails to show where in the drawings the microwave window of claim 26 is actually shown in the Ward '980 patent.

In view of the foregoing, claims 15-35 are allowable. Prompt and favorable action is solicited.

Respectfully submitted,



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# United States Patent and Trademark Office

An Agency of the Department of Commerce

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## Closing of the United States Patent and Trademark Office on Monday, February 8, 2010 through Thursday, February 11, 2010

In view of the official closing of the Federal government offices in the Washington, D.C. metropolitan area, including the United States Patent and Trademark Office (USPTO), from Monday, February 8, 2010 through Thursday, February 11, 2010, the USPTO will consider each day from Monday, February 8, 2010 through Thursday, February 11, 2010, to be a "Federal holiday within the District of Columbia" under 35 U.S.C. § 21(b) and 37 C.F.R. §§ 1.6, 1.7, 1.9, 2.2(d), 2.195 and 2.196. Any action or fee due from Monday, February 8, 2010 through Thursday, February 11, 2010 (or the preceding Saturday (February 6, 2010) or Sunday (February 7, 2010)) will be considered as timely for the purposes of, e.g., 15 U.S.C. §§ 1051(b), 1058, 1059, 1062 (b), 1063, 1064, 1126(d), or 35 U.S.C. §§ 119, 120, 133 and 151, if the action is taken, or the fee paid, on the next succeeding business day on which the USPTO is open. 37 C.F.R. §§ 1.7(a) and 2.196.

37 C.F.R. §§ 1.6(a)(2), 2.195(a)(4) and 2.198 provide that correspondence deposited in the Express Mail Service of the United States Postal Service (USPS) in accordance with

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### Previous Legal Notifications Related to Security Issues and Emergencies

- [Closing of the United States Patent and Trademark Office on Monday, December 21, 2009 \(24 Dec2009\) \[PDF\]](#)
- [Closing of the United States Patent and Trademark Office on Friday, December 26, 2008 \[signed 22 December 2008\] \(23Dec2008\) \[PDF\]](#)

The United States Patent and Trademark Office (USPTO) will be closed on Friday, December 26, 2008. Since Thursday, December 25, 2008, is a Federal holiday, the USPTO will consider both Thursday, December 25, 2008, and Friday, December 26, 2008, to be a "Federal holiday within the District of Columbia" under 35 U.S.C. § 21(b) and 37 C.F.R. §§ 1.6, 1.7, 1.9, 2.2(d), 2.195 and 2.196. .... [READ FULL NOTICE>>>](#)

- [United States Postal Service Interruption and Emergency under 35 U.S.C. 21\(a\) \[signed 18 September 2008\] \(29Sep2008\) \[PDF\]](#)

The United States Patent and Trademark Office (USPTO) is designating the interruption in service of the United States Postal Service (USPS) in the areas affected by Hurricane Gustav in Louisiana and Texas beginning on